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Case Report

OCCLUSAL STAMP TECHNIQUE FOR DIRECT RESIN COMPOSITE RESTORATION: A CLINICAL CASE REPORT

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ABSTRACT

Composite resin restoration on posterior teeth through the incremental technique is, generally, a time consuming procedure with risk of contamination between the layers. Therefore, It has been developed techniques to facilitate the work of dental professionals and achieve aesthetic and functional results such as the occlusal stamp technique. This technique makes the procedure faster by accurately copying the occlusal anatomy, allowing a little or no occlusal adjustment. The aim of the present study was to present a clinical case in which the stamp technique was performed and to describe the restorative treatment in a patient with hidden carie. It was observed that the stamp technique, when performed correctly, is a reliable and predictable method for the reconstruction of the occlusal anatomy.

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INTRODUCTION

Dentistry is facing a moment in which the search for excellence became constant and the aesthetic standard is increasingly demanding even in the posterior segment of the mouth. Therefore, the recovering of teeth aesthetics comprises several procedures that test technical and scientific knowledge, artistic sense and skills of the professional on the current composites in order to recreate anatomical details and make the most natural restorations possible [1,2].

In posterior teeth, primary caries lesions may present an intact occlusal morphology despite of the injury exceeds the dentino-enamel junction in terms of depth. For these cases, the literature describes a restoration technique using an occlusal stamp that allows to mimic the original tooth morphology by using the existing clinical condition before the necessary destruction of tooth surface, reducing the time required for the removal of excess and polishing of restorations [3,4,5,6].

This technique consists in taking an impression of the tooth structure, prior to cavity preparation for getting a stamp through the negative imprint of the anatomical shape of the occlusal surface. In order to perform this technique, it is essential that the occlusal area has not been destroyed and preserves its anatomical structure [7,8].

It is preconized that the precise indication of this method would be restricted to pits, cavities and fissures where the tooth present its intact anatomical features. Therefore, occlusal hidden caries can be restored by the stamp technique given that dentin injuries are clinically unnoticeable due to the intact enamel surface from an anatomical perspective [9,10,11]. This article aims at presenting a case report of direct composite resin restoration in posterior tooth with hidden caries, through the occlusal stamp technique.

Clinical Case Report

A 23 years-old man, systemically health, was referred on a dental clinic of the Federal University of Piauí (UFPI), Terezina, Brazil. After completing the required legal and ethical paperwork, the patient was admitted for dental treatment. The clinical examination showed the presence of dark pigments on pits and shading on the surface of the mandibular left second molar, without evidence of cavitation. (Figure 1)

The patient did not report pain sensitivity in the medical history, but a radiolucent area in the crown of the mandibular left second molar was observed through the interproximal radiographic examination (Figure 2) that suggested the presence of dentin carie lesion with no evidence of pulp involvement. The mandibular left first molar showed dental

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carie recurrence. Taking in account that the occlusal surface of the tooth involved had no change in their morphology, we opted for the occlusal stamp technique for resin composite restoration of the mandibular left second molar.



Figure 1. Occlusal aspect of the mandibular left second molar lesion confined to the occlusal surface and with relatively intact enamel.



Figure 2. Radiographic appearance of the compromised dentin of the mandibular left second molar.

The clinical-restorative process started by performing the dental prophylaxis with Robson type cleaning brush and pumice to remove the residues on the surface of the tooth and promote a proper color selection through the VITA shade guide. After tooth isolation with vaseline, the stamp was made with transparent heat cure acrylic resin to copy the tooth occlusal details to be restored. The stamp, after its complete curing, was removed and the corresponding edge on the buccal surface of the tooth was marked for orientation at the time of the stamp repositioning. (Figure 3).



Figure 3. Application under gentle pressure of the occlusal stamp on the occlusal surface of the mandibular left second molar

Under anesthesia and rubber dam isolation, it was performed a cavity preparation with spherical diamond drill at high speed to access the compromised dentine structure. The infected dentin was removed with the aid of dental spoon excavators and carbide burs at low speed. The cavity preparation was limited to the removal of the infected dentin, preserving the tooth structure.

After the complete removal of the dental carie, the cavity was rinsed and dentin-pulp complex was protected with calcium hydroxide cement given the depth of the lesion (Figure. 4)



Figure 4. Protection of dentin-pulp complex with calcium hydroxide cement.

Thereafter, the glass ionomer cement - GIC (sandwich technique) was used as a liner, leaving 2 mm for insertion of the resin composite. (Figure 5)



Figure 5. Glass ionomer cement used as a liner (sandwich technique)

It was performed the etching of the cavity with 37% phosphoric acid for 20 seconds. The cavity was washed with distilled water for 1 minute and carefully dried with cotton balls; The adhesive system (Prime & Bond 2.1 Dentsply) was applied according to the manufacturer's recommendations. Subsequently the resin composite (Opalis EA3) was accommodated in the cavity in a single increment of 2 mm, light cured with the vaselined stamp in the correct position for 20 seconds exerting finger pressure and light cured again for 20 seconds after removal of the stamp.

Lastly, after the removal of rubber dam isolation, the occlusal contacts were checked and it was found that there was no need for adjustment (Figure 6). The adaptation was considered satisfactory given the technique used, the stage of finishing and polishing was waived. At a later session, the restorative treatment of the mandibular left first molar was done.



Figure 6. Occlusal aspect of the mandibular left second molar after the resin composite restoration with the stamp technique.

DISCUSSION

The prevalence of dental caries has decreased in the last decades. It was credited to the effective use of fluorides, particularly, regarding the carious lesions on smooth surfaces [11]. On the other hand, The massive introduction of different fluoridated agents seems to have changed the morphological factor of the development of dental caries, leading to incidence of caries lesions where the enamel appears intact. This phenomenon has been identified as "Syndrome of Fluorides" and indicates the direct relationship of fluoride utilization with the increasing resistance of the enamel surface [9]

In 1975, dental composite resins were introduced in the European market being a controversial issue because some reports, from United States of American, claimed that their physical properties limited their use. Thus, several studies have been conducted with composite resins and today they are accepted as effective restorative materials. The dentist responsible for accelerating the research on restorative materials was Buonocore who, in 1955, introduced the acid-etching technique, representing the beginning of Adhesive Dentistry. Bowen in 1963, presented the composite resins as restorative materials [13].

Despite the decreasing prevalence of tooth decay and the need for direct restorations, dentin caries lesions ("hidden caries") is a frequent find in 14-20 years-old individuals. These lesions may leave the occlusal surface intact [13] and can be diagnosed by radiographic examination and, clinically, throughout darkened coloration below the translucent enamel. However, there are other methods to diagnose this type of injury such as endoscopy (AcuCam), laser fluorescence (DIAGNOdent), fiber-optic transillumination, digital radiography, electrical caries monitor and detection (ECM), among others [14].

The harmonic reconstruction of the posterior teeth occlusal surface morphology consists of a challenge for general practitioners and dental specialists. The occlusal stamp technique consists of a previous dental impression of the occlusal tooth face to be restored for further cavity preparation.

In the presented case, the material used was a transparent acrylic resin due to its easy handling, low cost and impression precision [15].

This technique allows to reestablish the form, function and aesthetic dental structure, reducing the need for occlusal post-restoration adjustments and the porosity of the resin composite. The pressure exerted by the stamp on the composite resin decreases the formation of microbubbles as well as interference of oxygen in the curing of the last layer. These are considered long-term success factors [8,16]. The limitations of this technique is related to the need to have the occlusal surface relatively intact and time spent confectioning the stamp [16].

Dental restorations that involve the use of glass ionomer cements associated with composite resins (sandwich technique), even showing some disadvantages, still represent the best alternative to minimize the microleakage in cavities with inexistent enamel on the cervical edge or when it is of inferior quality, representing a benefit for the restoration in a medium and long-term perspective[17,18]. It is important to mention that the professional must stay alert to the performing of the stamp technique given that its incorrect placement will cause distortions and the objective will not achieved [15,18].

CONCLUSION

The occlusal stamp technique is effective for direct composite resin restoration in posterior tooth with hidden caries and extensive dentin involvement. In addition, this technique minimizes the operative time by eliminating post-restoration occlusal adjustments.

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